

BASEBALL TRAINING SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] This invention relates to a baseball training and system and method and, more particularly, a baseball training and system training method that comprises a collapsible and portable collector that directs balls to a throwback unit that is capable of providing multiple adjustments to permit a characteristic, such as a ball size capability, ball return trajectory or angle of ball return.

DESCRIPTION OF RELATED ART

[0002] In the past, various ball throwing devices and nets have been used to assist training a player, especially a pitcher. For example, some of the devices disclose ball throwing devices in which a pair of rotary wheels are independently adjustable in speed to achieve the throwing of a ball with wide variations in velocity and curvature. Also, nets have been used in the past to collect thrown balls. However, there is no known patent or prior art that provides for a system and method that enables automatic collection of the balls and feeding of the balls which returns the balls to the player who throws the balls towards a target on the collector and in which the thrower is adjustable to accommodate balls of different sizes, to adjust the trajectory of balls thrown and which may be utilized in combination with other features, such as a speed sensor which measures a velocity of the ball and a ball sensor which provides an indication to the player when a ball is going to be thrown at him.

SUMMARY OF THE INVENTION

[0003] It is, therefore, a primary object of the invention to overcome one or more of the problems associated with the prior art devices by providing a ball pitching system and method that provides multiple adjustments of a characteristic of the ball throwing device, such as a ball trajectory adjustment and a ball size adjustment.

[0004] In one aspect, the invention comprises a baseball training system comprising a target, a collector for collecting balls thrown at the target by a thrower a throwback unit associated with said collector for receiving collected balls back to said thrower, said throwback unit comprising a base, a drive motor mounted on said base, a wheel coupled to said drive motor, and a guide, at least one of said wheel or said guide being adjustable to permit adjustment of a characteristic of said baseball training system.

[0005] In another aspect, the invention comprises a throwback system comprising a base, a drive motor mounted on said base a wheel coupled to and driven by said drive motor and a guide at least one of said wheel or said guide being adjustable to permit adjustment of a characteristic of said throwback system.

[0006] In still another aspect, the invention comprises a method for returning thrown balls to a player, said method comprising the steps of providing a throwback unit, situating said throwback unit in operative relationship with a collector for collecting balls thrown at a target associated with the collector, adjusting said throwback unit to accommodate a desired ball size and adjusting said throwback unit to return a ball along a predetermined ball return trajectory.

[0007] These and other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWING

- [0008]** Fig. 1 illustrates a perspective view of an embodiment of the invention;
- [0009]** Fig. 2 illustrates a side view illustrating various features of the track which guides balls towards a wheel;
- [0010]** Fig. 3 shows details of a ball adjustment system and ball gauge;
- [0011]** Fig. 4 is a side view of a throwback unit;
- [0012]** Fig. 5 is a fragmentary view of an adjustment and gauge feature;
- [0013]** Fig. 6 is a view illustrating the adjustment of a wheel relative to a guide for a first ball having a first size;
- [0014]** Fig. 7 illustrates an indicator which provides an indication of the ball size for the first ball;
- [0015]** Fig. 8 is a view of an adjustment and gauge feature for a second ball size;
- [0016]** Fig. 9 is a view similar to Fig. 6 showing the adjustment of the ball throwback unit for the second ball;
- [0017]** Fig. 10 is a view of an indicator indicating the size for the second ball shown in Fig. 9 after the throwback unit is adjusted for the second ball size;
- [0018]** Fig. 11 is an exploded view of the throwback unit;
- [0019]** Fig. 12 is a sectional view showing various details of a first adjuster for adjusting a relative position of the wheel relative to the guide and to adjust for a particular ball size;
- [0020]** Fig. 13 is a sectional plan view showing various details of the base and the second adjuster for adjusting a trajectory of a ball being thrown by the throwback unit;
- [0021]** Fig. 14 is a sectional fragmentary view showing linkage for the second adjuster;
- [0022]** Fig. 15 is a sectional fragmentary view showing further details of the second adjuster for changing a position of the guide which, in turn, changes a trajectory of a ball being thrown back by the machine;
- [0023]** Fig. 16 is a side view of the collector shown in Fig. 1;

- [0024]** Fig. 17 is a side view similar to Fig. 16 showing a front panel in a stored position and revealing a ball velocity sensor;
- [0025]** Fig. 18 is a view illustrating the floor being moved to a stored position;
- [0026]** Fig. 19 is a view illustrating various details of the floor showing the floor in the stored position;
- [0027]** Fig. 20 is a view showing various legs on the collector being moved to a collapsed position, with the top of the collector being folded down to a stored position;
- [0028]** Fig. 21 is a view illustrating means for retaining the floor in a closed and stored position;
- [0029]** Fig. 22 shows further details of means for locking the floor in a stored position;
- [0030]** Fig. 23 is a perspective view of the collector showing details of the frame;
- [0031]** Fig. 24 is a fragmentary view showing the angle of tilt associated with the floor which directs collected balls toward an aperture and ultimately toward the throwback unit; and
- [0032]** Fig. 25 is a fragmentary view showing means for pivoting the various members.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0033] Referring now to Fig. 1, a baseball training system 10 is shown. The baseball training system comprises a collapsible collector 12 defining a collection area 12a and comprising a target 14 at which a player, such as a pitcher or baseball player, may throw a ball 16. The system 10 further comprises a throwback unit 18 comprising a base 20, a drive motor 22 (Fig. 3), and a wheel 24 that is rotatably mounted on a hub 25 (Fig. 11) which is mounted on and rotatably driven by drive motor 22. The hub comprising a first hub member 25a and a second hub member 25b which are fastened together with a plurality of bolts 29 to retain and support the wheel 24 therebetween.

The system 10 further comprises a guide 26 (Fig. 4) that cooperates with the wheel 24 to define an area 27 for receiving the ball 16 to be thrown back to the player as described later herein.

[0034] Features of the collector 12 will now be described. As illustrated in Figs. 16-23, the collector 12 comprises a collapsible frame 28 having a material 30 mounted thereon. The material 30 may comprise or be made of any suitable material that is durable enough to withstand the impact of a ball being thrown at more than 90 miles per hour and yet flexible enough to permit the collector 12 to be folded in the manner described herein. The material 30 is mounted on the frame 28 by providing hems (not shown) along its border through which the frame 28 can be threaded. Alternatively, the material 30 could be provided with Velcro® or snaps along its borders to permit the material 30 to be detachably fastened to the frame 28. This facilitates cleaning the material 30.

[0035] Referring to Figs. 23 and 24, the frame 28 comprises a plurality of tubular frame members. Notice that frame members 32 and 34 are joined by a U-shaped member 36 that may be integrally formed with members 32 and 34 to provide a one piece U-shaped tubular construction, or alternatively, the ends 36a and 36b of member 36 could be provided to telescope either inside or outside of the members 30 or 32 in order to change an overall height H (Fig. 16) of the collector 12. It should be understood that one or more of the tubular members that make up frame 28 that telescope may be provided a plurality of spring-loaded detents (not shown) which cooperate with mating-holes or apertures (not shown) in the mating tubing members as is conventionally known in the camping arts. For example, ends of members 32 and 34 may be provided to have a smaller outer diameter than the inside diameter of ends 36a and 36b U-shaped member 36 so that it receives the members 32 and 34 to permit the ends 36a and 36b be easily coupled to 30 and 32, respectively. Thus, detents (not shown) may be provided to lock the member 36 to the members 32 and 34.

[0036] The frame 28 further comprises rear tubular members 38 (Fig. 23) and 40 which are joined by a support member 42 and are pivotally coupled to

the members 38 and 40 with brackets 44 and 48 as illustrated. The pivotal support or bracket 44 (Figs. 23 and 25) may be provided at the intersections of the various members, such as members 38 and 40, that make up the frame 28 to permit the member 38 to pivot relative to member 32, for example. Likewise, an end 40a of member 40 may be pivotally coupled to bracket 48 in order to permit the frame 28 to be collapsed and stored in the manner described herein.

[0037] Although not shown, one or more of the ends 38a and 40a may comprise spring-loaded detents, which cooperate with apertures or holes in the brackets 44 and 48 to permit the tubular members 38 and 40 to be disassembled from the brackets 44 and 48 in a manner similar to what is conventionally known in camping arts mentioned earlier.

[0038] The collector 12 further comprises a floor 50 (Figs. 16 and 23) that is pivotally coupled between members 38 and 40 and pivots about an axis defined by an arrow in Fig. 23. As best illustrated in Fig. 23, note that the floor 50 is generally rectangular and is defined by a plurality of frame members 54, 56, 58 and 60. Notice that a pair of generally U-shaped frame members 62 and 64 are situated between frame members 56 and 60 as shown. The frame members 62 and 64 support material 30 (Fig. 16) to define a trough or channel 65 (Fig. 1) to direct balls 16 collected in area 12a to an aperture or opening 68 (Figs. 1 and 2) in wall 71.

[0039] The frame member 62 comprises a first leg portion 62a, a second leg portion 62b and a joining portion 62c that joins the portions 62a and 62b. Likewise, the member 64 comprises a first leg portion 64a, a second leg portion 64b and a joining portion 64c. Notice a length of the joining portion 64c is shorter than a length of the joining portion 62c of member 64 as shown. It should be understood, as viewed in Figs. 16-20, that the members 54, 56 and 58 and 60 cooperate with the members 62 and 64 to support the material 30 at an angle θ (Fig. 24) such that a trough or channel 65 is defined that terminates at an opening 68 in a wall 71 (Fig. 2) defined by the material 30. Notice in Fig. 24 that the angle θ is on the order of about 5-20 degrees.

[0040] The collector 12 further comprises a ball speed sensor 76 (Figs. 17-20), that measures and displays a speed of the ball 16 thrown at the target

14 in miles per hour (mph). The collector 12 comprises a front panel 78 (Fig. 16) that is pivotally mounted to member 60 and pivotal in the direction of arrow D in Fig. 16 so that the panel 78 may be moved to a stored position shown in Figs. 17-20. Note that when the panel 78 is in the position illustrated in Figs. 1 and 16, it is slightly angled relative to the ground so that any thrown balls 16 that hit the panel 78 will be deflected into the collection area 12a of collector 12. Also, notice that the panel 78 may comprise a transparent window 80 to protect the ball speed sensor 76, while permitting the sensor 76 to capture a speed of a thrown ball 16. In the embodiment being described, the panel 80 is generally planar and made of transparent Plexiglas® to enable the speed to be displayed on a display coupled to the sensor 76.

[0041] In the embodiment being described, the collector 12 collapses as will now be described relative to Figs. 16-22. First, the panel 78 is moved from the down position shown in Fig. 16 to the stored position shown in Fig. 17, and the floor 50 is then pivoted upward in the direction of arrow C (Figs. 17 and 18) to the upright and stored position shown in Fig. 19.

[0042] As illustrated in Fig. 20, the frame members 32, 34 and 36 may be moved to a collapsed or closed position shown in Fig. 20. Although not shown, the member 36 may be integral with member 32 or 34 or joined thereto as described earlier herein. The member 36 may be provided separate from members 32 and 34. The ends 32a and 34a may be provided to comprise a concave shape in cross-section to receive the ends 36a and 36b, respectively, as shown in Fig. 26. A nut 190 and bolt 192 are used to secure the ends 36a to end 32a and end 36b to end 34a. The nut 190 and bolt 192 can be loosened to enable member 36 to be pivoted in the direction of arrow E (Fig. 19) to the closed position shown in Fig. 20. In an alternate embodiment, the member 36 may be pivotally coupled to members 32 and 34 by a bracket (not shown) to be folded down.

[0043] After the floor 50 is moved to the stored position shown in Fig. 19, the member 36 of the frame 28 is moved to the collapsed or stored position shown in Fig. 20. If it is desired to lock the floor 50 in a stored position, a retainer 90 (Fig. 21) is provided and may be received in aperture 92, as

illustrated in Figs. 21 and 22. The collector 12 has wheels 95 and 97 (Fig. 1) to permit the user to roll and move the collector 12.

[0044] The system 10 further comprises the throwback unit 18 which will now be described. As illustrated in Fig. 1, the throwback unit 18 is situated adjacent to collector 12 and receives collected balls 16 through the aperture 68 of collector 12. The balls 16 are retrieved in a collection track or grate 92 (Figs. 2 and 11), which has a latch or hook 94 that is received by a mating U-shaped channel member 96 (Fig. 2), that is mounted on the member 58 of floor 50, as illustrated in Fig. 2. The track 92 comprises a first track 92a, a second track 92b and a pivotal coupling 92c for coupling the first and second tracks 92a and 92c together. The coupling 92c permits the unit 18 to pivot in the direction of arrows F and G relative to the track 92a. The throwback unit may be provided with a cage 18 surrounding wheel 24 as shown in Fig. 1.

[0045] Referring now to exploded view in Fig. 11, the throwback unit 90 comprises the base 20, which has a pair of wheels 96 and 98 rotatably mounted onto brackets 100 and 102, respectively, with screws 104 and 106. The base 20 further comprises a post 108 on which a tubular handle 110 is mounted and may telescope. The tubular handle 110 comprises a grip 111 and a hand adjustable lock fastener 112 for securing the tubular member 110 to the post 108 after a user adjusts the handle 110 in the direction of double arrow K to a desired height. The grip 111 and wheels 96 and 98 enable the throwback unit 90 to be tilted in the direction of arrow G (Fig. 11) so that it can be rolled on the wheels 96 and 98 and moved to a desired location.

[0046] The throwback unit 90 further comprises a first adjuster 114 (Figs. 1 and 12) for adjusting the throwback unit 90 to accommodate different sizes of balls 16. The adjuster 114 comprises a support post 116 having a tubular member 118 adjustably and slidably mounted thereon. The tubular member 118 comprises a pair of brackets or mounts 120 and 121 for providing a ball size as described later herein. The motor 22 is mounted on post 118 with bolts 122 as shown.

[0047] As best illustrated in the sectional view shown in Fig. 12, the adjuster 114 comprises a threaded member 132 that is threadably received in

the threaded sleeve 134 that is integral with tubular member 118 such that when the crank or handle 136 of adjuster 114 is rotated, the tubular member 118 and drive motor 22 move in the direction of double arrow L as shown. After adjustment, a threaded lock nut 144 (Fig. 11) may be used to lock the members 118 and 116 together.

[0048] It should be understood that the adjuster 114 enables the system and method of the present invention to be adjustable in order to accommodate balls of different sizes, such as girls' baseballs used in playing hardball and softball or boys' baseballs used when playing softball or hardball.

[0049] As illustrated in Fig. 11, to facilitate measuring a size of the ball 16, the throwback unit 90 further comprises a ball gauge 138 comprised of a first gauge member 140 and a second gauge member 142. The gauge members 140 and 142 receive the ball 16, as illustrated in Fig. 3. The rotatable handle or crank 136 (Fig. 12) is rotated until the members 140 and 142 engage the ball 16 until a distance, indicated by double arrow I in Fig. 5, is set to correspond to the diameter of the ball 16. After the adjuster 114 is set to the appropriate ball size, the hand nut 144 may be tightened to lock the member 118 to post 116.

[0050] The throwback unit 90 further comprises a visual ball-size gauge 146 comprising a pivotal gauge arm 148, as best illustrated in Fig. 3. The arm 148 has an L-shaped spring support 150 that receives a spring 152 that biases the arm 148 toward the tubular member 118 as shown. It should be understood that when the crank or handle 136 is rotated such that the tubular member 118 move in the direction of arrow L shown in Fig. 12, the bracket 121 cooperates with a projection 154 mounted on arm 148 to cause an indicator 156 to move along a top surface of bracket 120. The indicator 156 cooperates with indicia 158 (Figs. 7 and 10) to provide an indication of the size of ball 16 that is situated between the gauge and members 140 and 142 (Figs. 5 and 8). For example, note in Figs. 5-7, a ball 16 is situated between the gauge members 140 and 142 as shown. The crank 136 is rotated until the members 140 and 142 engage the ball 16 and the distance I generally corresponds to the diameter of the ball 16, which in turn causes a distance J (Fig. 6) between the

wheel 24 and the guide 26 to be adjusted to correspond to the size of ball 16. Indicator 156 cooperates with indicia 158 to provide a ball size indicator.

[0051] Further to the illustration, Figs. 8-10 show a ball 16 of a larger diameter than that shown in Figs. 5-7. In this illustration, the rotatable crank 136 (Fig. 3) is rotated until the gauge members 140 and 142 are adjusted such that the height H generally corresponds to the diameter of the ball 16. As with the illustration discussed earlier herein relative to Figs. 5-7, the distance J between the wheel 24 and guide 26 is simultaneously adjusted to the correct ball size. As with the illustration in Figs. 5-7, note that the indicator 156 (Fig. 10) also simultaneously moves and cooperates with the indicia 158 to provide an indication of the ball 16 size. As with the smaller ball shown in Figs. 5-7, the indicator 156 and indicia 158 may be used to provide an initial rough adjustment of the distance J (Figs. 6 and 9) to the desired ball 16 size by rotating the crank 136 and using the indicia 156 to adjust the distance between the wheel 24 and guide 26. Next, finer adjustments may be made by actually placing a ball 16 between the gauge members 138 and 140 and rotating the crank 136 to the desired ball size.

[0052] The system 10 further comprises a trajectory adjuster 160 (Fig. 13) which will now be described. The trajectory adjuster 160 provides adjustment to enable a user to launch or return the ball 16 along a pre-determined trajectory. For example, Fig. 2 illustrates the trajectory adjuster 160 being set such that it launches a ball 16 along a first trajectory T1. The trajectory adjuster 160 can be adjusted in the manner described herein to cause the ball to be launched on a different desired trajectory, such as the illustrated trajectory T2 shown in Fig. 2. Fig. 13 illustrates a sectional plan view of the base 20 showing various details of the trajectory adjuster 160 which will now be described.

[0053] The trajectory adjuster 160 comprises a post 162 (Figs. 11 and 13) comprising a threaded nut 164 (Fig. 11) mounted by conventional means, such as a weld, underneath the gauge meter 142.

[0054] A rotatable handle or crank 166 rotatably drives the threaded member 168 which cooperates with the nut 164 to drive linkage 170 which, in

turn, pivotally drives a connector member 172. This causes a pivot linkage member 174 (Fig. 11) to drive a connector 173 that causes a guide 26 actuator 177 to engage surface 26a of guide 26, thereby raising and lowering the guide 26, as illustrated in Fig. 15. Thus, when a user rotates the crank 166 in a counterclockwise direction, for example, the linkage 170 is pulled toward the nut 164. This, in turn, causes the pivot member 177 to engage the surface 26a of guide 26 and move it away from the base 20, thereby causing the ball 16 to be returned to the player at the higher trajectory, such as trajectory T2 illustrated in Fig. 2. Likewise, if it is desired to lower the trajectory, for example, to the trajectory T1 illustrated in Fig. 2, then the user rotates the crank 166 in a clockwise direction which, in turn, causes the guide 26 to lower.

[0055] It has been found that it may be necessary or desired to adjust the ball height adjuster 114 after the trajectory adjuster 160 has been set. It should be understood, however, that a user may adjust one or both of the ball height adjuster 114 or the trajectory 160 as necessary to adjust the throwback unit 18 to the desired ball size and ball return trajectory.

[0056] Advantageously, this system and method provide a convenient baseball training system and method that provides a portable and collapsible collector 12 with a portable ball return or throwback unit 18. During use, a player may throw the ball 16 at the target 14. The ball 16 falls into the collection area 12a provided by the collector 12 and the angled floor 50 causes the ball 16 to be directed toward the aperture 68 in sidewall 71. The ball 16 falls onto the feed guide or trench 92 (Fig. 2), whereupon it is directed toward an area 27 (Figs. 2 and 4) between the guide 26 and wheel 24.

[0057] The rotating wheel 24 cooperates with the guide 26 to return or throw the ball 16 back toward the player. In this regard, it should be understood that the throwback unit 18 may be coupled to the collector 12 with the latch 94 (Fig. 2) as described earlier. The pivotal coupling 92c permits the track member 92a to pivot in the direction of arrow F (Fig. 11) relative to base 20. This enables the base 20 to be pivoted toward different players in the field of play, as well as toward a player located in front of the collector 12.

[0058] As mentioned earlier herein, the system 10 further comprises a speed sensor measure 76 (Fig. 17) which measures the speed of an incoming thrown ball 16 through the transparent window 80 (Fig. 1) and displays the measurement through the window 80 to the player. Alternatively, a separate display, such as a larger liquid crystal display may be coupled to sensor 76 and situated adjacent to the collector 12 to provide a read-out display or display of the speed of the ball 16 thrown at the target 14.

[0059] Although not shown, a computer (not shown) may be coupled to sensor 76 to collect data regarding pitches thrown toward target 14.

[0060] Moreover, the system 10 may be provided with a ball load sensor 180 (Figs. 3, 4 and 11) which senses when a ball 16 is situated in the area 27 between the guide 26 and the wheel 24 and is about to be returned. The system 10 further comprises an audio output speaker (not shown) coupled to the sensor 180 which provides an audible sound when the ball 16 is loaded between the guide 26 and wheel 24. In the embodiment being described, the motor 22 may be model number 2130 available from Leeson Electric of Willoughby, OH, the speed sensor 76 is a model number Speed Check available from Speed Check, of Edina, MN; and sensor 180 is a model number PA18 available from Carlos Gavazzi of Cleveland, OH. Each of the motor 22, sensor 76 and sensor 180 is coupled to a suitable power source with suitable electrical connectors, all of which are not shown for ease of illustration.

[0061] Advantageously, this system provides a convenient means and method for providing a portable throwback unit 18 that can be situated in operative relationship with a portable and collapsible collector 12. The throwback unit 18 can be adjusted to accommodate numerous ball sizes and can also be adjusted to return a ball along a pre-determined ball return trajectory. The baseball training system 10 can be used to return thrown balls to a player or multiple players by simply adjusting the location of the throwback unit 18. Also, it envisioned that the unit 18 can be used as a field training device such that the throwback unit 18 can be positioned to throw balls 16 along different trajectories and any desired angle of ball 16 return relative to the collector 12. Because the base 20 can be pivoted relative to the track 92, a

trainer can use the grip 111 to adjust the position of the throwback unit 90 to direct it towards the player in the field. After the throwback unit 18 throws the ball 16 towards a first player, for example, the throwback unit 18 can be adjusted or moved so that it throws the ball 16 towards a second player in the field. For example, ground balls 16 may be thrown at a player in the infield or outfield who throws the balls 16 back toward target 14 and into the collection area 12a of collector 12, which again throws the balls to the player on the predetermined or desired trajectory. Also, the trajectory can be altered as desired herein to throw line drives, shallow pop-ups, or ground balls.

[0062] While the system and method described herein constitute preferred embodiments of this invention, it is to be understood that the invention is not limited to this precise system and method, and that changes may be made in either without departing from the scope of the inventions, which is defined in the appended claims.

[0063] What is claimed is: